

What is claimed is:

1. A support frame for a thin-film mirror comprising,
 - a) a pan-shaped housing having a pan surface and a hollow wall joined to and surrounding the pan surface,
 - b) the hollow wall having a top mounting surface portion for
5 thin reflecting film, stepped above the pan surface,
 - c) the pan-shaped housing member, including the hollow wall, having the shape of a polygon with the hollow wall having a predetermined number of sides intersecting at a corresponding said predetermined number of corners that define a corresponding said predetermined number of corner angles,
10 d) at least one corner having a corner angle that is less than or equal to 90 degrees, and
 - e) said hollow wall at said at least one corner having a fillet formed as a portion of said hollow wall, said fillet bordering the pan surface and making an obtuse angle with each of the intersecting wall portions at said
15 at least one corner, and said fillet having a fillet top surface formed as a coplanar continuation of the top mounting surface portion of said hollow wall.
2. The support frame as claimed in claim 1 wherein the hollow wall, the fillet at said at least one corner angle and the pan surface are formed as a one-piece integral molded structure.

3. The support frame as claimed in claim 1 wherein the hollow wall has an open bottom portion opposite the top mounting surface portion.

4. The support frame as claimed in claim 3 wherein each of the predetermined number of sides of the hollow wall have spaced inside and outside wall portions, said pan-shaped housing further including a flange on the outside wall portions at the open bottom portion, said flange extending
5 away from the outside wall portions in a direction substantially parallel to the top mounting surface portion of said hollow wall.

5. The support frame as claimed in claim 4 wherein said flange is formed with at least two suspension portions for accommodating fasteners for joining said thin film mirror to a support surface.

6. The support frame as claimed in claim 3 wherein each of the predetermined number of sides of the hollow wall have spaced inside and outside wall portions, the inside wall portion bordering the pan surface and the top mounting surface portion of the hollow wall, and the outside wall
5 portion bordering the top mounting surface portion of the hollow wall.

7. The support frame as claimed in claim 3 wherein the hollow wall with the open bottom portion defines a U-shaped well and a reinforcing member having a size and shape corresponding to the shape of said hollow wall, is secured in said U-shaped well to rigidify said pan-shaped housing.

8. The support frame as claimed in claim 7 wherein the top mounting surface portion of said hollow wall has an undersurface within the U-shaped well, and the reinforcing member, in cross-section, has two spaced sides, the reinforcing member being positioned in the U-shaped well of the hollow wall such that one of the spaced sides makes surface contact with the undersurface of said hollow wall, and the other said spaced side extends a predetermined distance below the pan surface to form a stacking leg that permits stacking of thin film mirrors, wherein the stacking leg of one support frame can be seated on the pan-shaped housing member of another support frame in alignment with the top mounting surface portion of the other support frame.

9. The support frame as claimed in claim 8 wherein the reinforcing member is U-shaped in cross-section with a web portion joining the two spaced sides, and the hollow wall has spaced inside and outside wall portions, the inside wall portion bordering the pan surface, and the web portion of the reinforcing member is adjacent the inside wall portion.

10. The support frame as claimed in claim 8 wherein the reinforcing member is U-shaped in cross-section with a web portion joining the two spaced sides, and the hollow wall has spaced inside and outside wall portions, the inside wall portion bordering the pan surface, and the web portion of the reinforcing member is adjacent the outside wall portion.

11. The support frame as claimed in claim 2 wherein the pan-shaped member and the hollow wall have a trapezoidal perimeter, and two corner angles that are acute, and the hollow wall having one of said fillets at each corner having said acute corner angles.

12. The support frame as claimed in claim 1 wherein said hollow wall has spaced inside and outside wall portions and the fillet has an inside wall that makes an obtuse angle with the inside wall portions of the intersecting walls at said at least one corner.

13. The support frame as claimed in claim 1 wherein said hollow wall has an inside space and said fillet is hollow and has an inside space that communicates with the inside space of the hollow wall.

14. The support frame as claimed in claim 13 wherein the pan-shaped member and the hollow wall have a trapezoidal perimeter, and two corner angles that are acute, and the hollow wall having one of said fillets at each corner having said acute corner angles.

15. A support frame for a thin-film mirror comprising,

a) a molded, plastic one-piece support housing of predetermined shape having a pan surface and a hollow wall of U-shaped cross-section surrounding the pan surface,

5 b) the hollow wall having spaced inside and outside wall portions, and a film mounting surface portion for thin reflective film joining the spaced inside and outside wall portions, the film mounting surface portion being substantially parallel to the pan surface and being stepped away from the pan surface.

16. The support frame as claimed in claim 15 wherein the one-piece support housing including the hollow wall have a trapezoidal periphery, wherein said hollow wall has four sides intersecting at four corners that define four corner angles, two of the corner angles being acute angles.

17. The support frame as claimed in claim 15 wherein a flange is formed on the outside wall portions extending away from the outside wall portions in a direction substantially parallel to the film mounting surface portion.

18. The support frame as claimed in claim 16 wherein said hollow wall includes a fillet at two corners where the sides of the hollow wall intersect at acute angles, said fillet making an obtuse angle with the inside wall portions of the intersecting sides at each of the two corners with acute
5 angles, said fillet being formed as a portion of said hollow wall and having a fillet surface that is a coplanar continuation of the film mounting surface portion of said hollow wall.

19. The support frame as claimed in claim 15 wherein the hollow wall defines a well and a reinforcing member of a size and shape corresponding to the hollow wall is secured in the well of the hollow wall to rigidify the hollow wall of said support housing.

20. The support frame as claimed in claim 19 wherein said one-piece support housing including the hollow wall have a trapezoidal periphery and said reinforcing member is a one-piece elongated member with opposite free end portions and three spaced notches between the free end portions that permit
5 folding of said elongated member into the corresponding trapezoidal periphery of said hollow wall for securance in the well of said hollow wall.

21. A method of substantially eliminating wrinkling of thin reflective film in a thin film mirror comprising,

- a) molding a one-piece polygonal pan-shaped housing with a pan surface with a selected peripheral shape and with a hollow U-shaped wall of
5 corresponding peripheral shape surrounding the pan surface,
- b) forming the hollow U-shaped wall with an open bottom portion proximate the pan surface and with a top mounting surface stepped away from the pan surface,
- c) forming a one-piece reinforcing member of a size and shape
10 that corresponds to the selected peripheral shape of the hollow wall,
- d) securing the one-piece reinforcing member in the hollow space or well of the hollow wall to rigidify the pan-shaped housing and,
- e) bonding a thin reflecting film on the film mounting surface such that the thin reflecting film spans the pan surface.

22. The method of claim 21 including forming the hollow wall in the shape of a four-sided polygon with two acute corner angles.

23. The method of claim 22 including forming a fillet as a portion of the hollow U-shaped wall, at each of the two acute corner angles, such that the fillet fills in the vertex of the acute angle and providing a fillet surface for the fillet that is coplanar and continuous with the film mounting portion of the

5 hollow wall and further providing an inner wall of the fillet that makes an obtuse angle with the hollow wall portions that intersect at an acute angle.